

**CLAIMS:**

- 1        1. A method for positioning pulses, comprising the steps of:  
2                specifying pulse positioning over time in accordance with a time layout about  
3        a time reference,  
4                generating a time-hopping code; and  
5                mapping pulses over the time layout based on the time hopping code, wherein  
6        a pulse can be placed at any location within said time layout.
- 1        2. The method of claim 1, wherein said time reference is a time position of a  
2        pulse.
- 1        3. The method of claim 2, wherein said pulse is a preceding pulse.
- 1        4. The method of claim 2, wherein said pulse is a succeeding pulse.
- 1        5. The method of claim 1, wherein said time reference is at least one of a fixed  
2        and a non-fixed time reference.
- 1        6. The method of claim 1, wherein said time hopping code has a predefined  
2        property.
- 1        7. The method of claim 6, wherein the pre-defined property is at least one of  
2        spectral properties and correlation properties.
- 1        8. The method of claim 7, wherein the correlation property comprises at least one  
2        of autocorrelation properties and cross-correlation properties.
- 1        9. The method of claim 1, wherein said time-hopping code comprises at least one  
2        of a hyperbolic congruent code, quadratic congruent code, linear congruent code,  
3        Welch-Costas array code, Golomb-Costas array code, pseudorandom code, chaotic code, and  
4        Optimal Golomb Ruler code.
- 1        10. The method of claim 1, wherein the time layout is comprised of a plurality of  
2        frames.

1           11.   The method of claim 10, wherein said frame is comprised of a plurality of  
2   sub-frames.

1           12.   The method of claim 11, wherein said sub-frame is comprised of a plurality of  
2   smaller components.

1           13.   The method of claim 12, wherein said smaller components are further  
2   subdivided.

1           14.   The method of claim 1, wherein the time layout is a delta value layout.

1           15.   An impulse transmission system comprising:

2                 a Time Modulated Ultra Wideband Transmitter;

3                 a Time Modulated Ultra Wideband Receiver; and

4                 said Time Modulated Ultra Wideband Transmitter and said Time Modulated  
5   Ultra Wideband Receiver employ a time-hopping code, wherein said code specifies pulse  
6   positioning over time in accordance with a time layout about a time reference, and a pulse  
7   can be placed at any location within said time layout.

1           16.   The impulse transmission system of claim 15, wherein said time reference is a  
2   time position of a pulse.

1           17.   The impulse transmission system of claim 16, wherein said pulse is a  
2   preceding pulse.

1           18.   The impulse transmission system of claim 16, wherein said pulse is a  
2   succeeding pulse.

1           19.   The impulse transmission system of claim 15, wherein said time reference is at  
2   least one of a fixed and a non-fixed time reference.

1           20.   The impulse transmission system of claim 15, wherein said time hopping code  
2   has a predefined property.

1           21.   The impulse transmission system of claim 20, wherein the pre-defined  
2   property is at least one of spectral properties and correlation properties.

1           22. The impulse transmission system of claim 21, wherein the correlation property  
2 comprises at least one of autocorrelation properties and cross-correlation properties.

1           23. The impulse transmission system of claim 15, wherein said time-hopping code  
2 comprises at least one of a hyperbolic congruent code, quadratic congruent code, linear  
3 congruent code, Welch-Costas array code, Golomb-Costas array code, pseudorandom  
4 code, chaotic code, and Optimal Golomb Ruler code.

1           24. The impulse transmission system of claim 15, wherein the time layout is  
2 comprised of a plurality of frames.

1           25. The impulse transmission system of claim 24, wherein said frame is comprised  
2 of a plurality of sub-frames.

1           26. The impulse transmission system of claim 25, wherein said sub-frame is  
2 comprised of a plurality of smaller components.

1           27. The impulse transmission system of claim 26, wherein said smaller  
2 components are further subdivided.

1           28. The impulse transmission system of claim 15, wherein the time layout is a delta  
2 value layout.

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